R20 Regulation *Subject code:3E2AH*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B. Tech II Semester Supplementary Examinations, January 2026

SEMICONDUCTOR DEVICES AND CIRCUITS

(Common to EEE, CSE, IT , CSE(AI&ML) & CSE(DS))

Maximum Marks: 70 Date: 22.01.2026 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	What is doping.	2M	1	L1
2	Define static and dynamic forward resistances.	2M	1	L1
3	Write about Avalanche break down mechanism.	2M	2	L1
4	Draw V-I characteristics of SCR.	2M	2	L1
5	Define PIV and Ripple factor of a rectifier.	2M	3	L1
6	Draw the circuit of Bridge rectifier with capacitor filter.	2M	3	L1
7	Explain Thermal runaway.	2M	4	L1
8	Define Early effect.	2M	4	L1
9	Write the differences between BJT and FET.	2M	5	L1
10	Draw the symbols of JFET and MOSFET?	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	a) Explain how depletion layer is formed in P-N junction Diode with neat diagrams. b) Determine the value of forward current for a PN junction with Io = 15μA , V_f = 0,6V , at T=300K.Assume silicon diode.	6M 4M	1	L2
	OR			
12	Explain the operation of a Tunnel Diode using Energy band diagrams.	10M	1	L2
13	Explain the V-I characteristics of Zener diode with neat sketches and write its applications..	10M	2	L2
	OR			
14	a) Explain the operation of NPN Transistor. b) The emitter current in transistor is 4 mA. If the leakage current Icbo is 6milli amps and alpha is 0.98 , find the collector and base currents.	5M 5M	2	L2
15	Draw the circuit and explain the operation of a Bridge Rectifier. Derive	10M	3	L2

	its RMS current and Ripple factor.			
	OR			
16	Draw and explain the circuit diagram and operation of full wave rectifier with π section filter.	10M	3	L2
17	Explain the input and output characteristics of CE configured transistor circuit with a neat circuit diagram.	10M	4	L2
	OR			
18	Explain the Voltage divider biasing technique of a Transistor and derive its stability factor	10M	4	L2
19	With the help of neat circuit diagram explain the operation of N-channel JFET .	10M	5	L2
	OR			
20	Explain the construction and operation of a Depletion MOSFET and draw its characteristics.	10M	5	L2